REMARKS/ARGUMENTS

1. **Rejection of claims 10, and 12-15 under 35 U.S.C. 103(a) as being unpatentable over Habermehl et al. (US 6,174,820) in view of Lin et al. (US 6,642,593):**

Claim 10 has been amended to overcome this rejection. Specifically, the limitation of "a stationary electrode directly positioned on the insulating substrate and below the diaphragm" is added to claim 10. This limitation finds support in Fig.2 for instance, and no new matter is entered. The amended claim 10 is listed thereinafter for reference.

Claim 10 (currently amended) A capacitive semiconductor pressure sensor comprising:
an insulating substrate selected from the group consisting of glass and quartz;
a conductive movable diaphragm;
a supporter positioned on the insulating substrate for fixing two ends of the diaphragm and forming a sealed cavity between the diaphragm and the insulating substrate;
a stationary electrode directly positioned on the insulating substrate and below the diaphragm; and
a control circuit electrically connected to the diaphragm and the stationary electrode.

Regarding US 6,174,820, Habermehl discloses a MEMS device including:
a monocrystalline silicon wafer 12;
a hinged member 110;
a supporter 66;
stationary electrodes 112; and
electric circuitry 54.

In Habermehl's teaching, the MEMS device is formed on a monocrystalline silicon wafer, which may be insulating if not doped. However, Habermehl fails to teach or suggest that the monocrystalline silicon wafer can be a glass substrate or a

quartz substrate. Therefore, claim 10 is patentably distinct from Habermehl's teaching.

Lin (US 6,642,593) teaches a substrate 20 (Fig.1h) which can be made of other microwave quality substrate such as a quartz or sapphire substrate. The Examiner asserts that it would have been obvious to one having ordinary skill in the art at the time of the invention was made to form a glass substrate or a quartz substrate in Habermehl's device. However, the applicant disagrees with that for the following reason. In Lin's teaching, the substrate 20 includes an insulator layer 30 such as a silicon dioxide layer, and the electrode layer 40 is formed on the insulator layer 30, instead of on the substrate 20. On the contrary, the stationary electrode 40 of claim 10 is positioned **directly** on the glass substrate or the quartz substrate 32 as recited in the amended claim 10. Thus, the applicant believes the amended claim 10 is patentable over Habermehl's teaching in view of Lin's teaching, and therefore it would not have been obvious to one having ordinary skill in the art to form the glass substrate or the quartz substrate in Habermehl's device in view of Lin's disclosure. Claims 12-15 are dependent on claim 10 and should be allowed if claim 10 is allowed.

Reconsideration of claims 10, and 12-15 is therefore respectfully requested.

2. **Rejection of claims 10 and 12 under 35 U.S.C. 103(a) as being unpatentable over Scheiter et al. (US 6,140,689) in view of Lin et al. (US 6,642,593):**

Claim 10 has been amended to overcome this rejection. Specifically, the limitation of "a stationary electrode directly positioned on the insulating substrate and below the diaphragm" is added to claim 10. This limitation finds support in Fig.2 for instance, and no new matter is entered. The amended claim 10 is listed thereinafter for reference.

Claim 10 (currently amended) A capacitive semiconductor pressure sensor comprising:
an insulating substrate selected from the group consisting of glass and quartz;

a conductive movable diaphragm;

a supporter positioned on the insulating substrate for fixing two ends of the diaphragm and forming a sealed cavity between the diaphragm and the insulating substrate;

a stationary electrode directly positioned on the insulating substrate and below the diaphragm; and

a control circuit electrically connected to the diaphragm and the stationary electrode.

Regarding US 6,140,689, Scheiter discloses a MEMS sensor including:

a SOI substrate (col.2, lines 50-53);

a membrane 7 (col.2 lines 58-60);

a spacer layer 4 (col. 2 lines 55-57);

a cavity 6 located in the spacer layer 4 (col.2 lines 57-58);

a doped region 8 (col.3 lines 3-9); and

a MOSFET 11 (col.3 lines 26-29)

In Scheiter's teaching, the MEMS sensor is formed on a SOI substrate. Accordingly, the manufacture process of Scheiter's MEMS sensor is more complicated than that of the present application. For instance, a recess 9 must be formed on the back surface of the SOI substrate, and manufacture costs are higher. On the contrary, the pressure sensor of the present application has a simpler structure and simpler processes. Most importantly, Scheiter fails to teach or suggest that the SOI substrate can be a glass substrate or a quartz substrate. Therefore, the present application is patentably distinct from Scheiter's teaching.

The Examiner also mentioned that Lin (US 6,642,593) teaches a substrate 20 (Fig.1h) which can be made of other microwave quality substrate such as a quartz or sapphire substrate, and asserts that it would have been obvious to one having ordinary skill in the art at the time of the invention was made to form a glass substrate or a quartz substrate in Scheiter's pressure sensor. However, the applicant disagrees and asserts that it would not have been obvious to one having ordinary skill in the art to incorporate Lin's teaching into Scheiter's teaching. In Lin's teaching, the substrate 20 requires an insulator layer 30 such as a silicon dioxide layer, and the electrode layer

40 is formed on the insulator layer 30, rather than on the substrate 20. Also, Scheiter's MEMS sensor is also formed on an insulating layer 2 of a SOI substrate. On the other hand, the stationary electrode 40 of the present application is directly positioned on the glass substrate or the quartz substrate 32 as recited in the amended claim 10. Thus, the applicant believes the amended claim 10 is patentable over Scheiter's teaching in view of Lin's teaching, and it would not have been obvious to one having ordinary skill in the art to implement the present application in view of Scheiter's MEMS sensor and Lin's teaching. Claim 12 is dependent on claim 10 and should be allowed if claim 10 is allowed.

Reconsideration of claims 10 and 12 is therefore respectfully requested.

3. **Rejection of claims 20-21 under 35 U.S.C. 103(a) as being unpatentable over Habermehl et al. (US 6,174,820) in view of Lin et al. (US 6,642,593) as applied to claim 10 above and further in view of Shrauger (US 2003/0020094):**

Claims 20-21 are dependent on claim 10 and should be allowed if claim 10 is allowed. Reconsideration of claims 20-21 is therefore respectfully requested.

4. **Rejection of claims 20-21 under 35 U.S.C. 103(a) as being unpatentable over Scheiter et al. (US 6,140,689) in view of Lin et al. (US 6,642,593) as applied to claim 10 above in view of Shrauger (US 2003/0020094):**

Claims 20-21 are dependent on claim 10 and should be allowed if claim 10 is allowed. Reconsideration of claims 20-21 is therefore respectfully requested.

5. **Rejection of claims 1,3, 5-15, 17, 19 and 22 under 35 U.S.C. 103(a) as being unpatentable over Guo et al. (US 6,472,962) in view of Habermehl et al. (US 6,174,820) and Bhattacharyya (US 6,845,034) and further in view of Lin et al. (US 6,642,593):**

Claim 1 has been amended to overcome this rejection. Specifically, the limitation of "a stationary electrode directly positioned on the non-single-crystal-silicon-based substrate and below the polysilicon diaphragm" is added to claim 1. This limitation finds support in Fig.2 for instance, and no new matter is entered. The amended claim 1 is listed thereinafter for reference.

Claim 1 (currently amended) A capacitive semiconductor pressure sensor comprising:
a non-single-crystal-silicon-based substrate selected from the group consisting of glass and quartz;
a conductive movable polysilicon diaphragm;
a polysilicon supporter positioned on the non-single-crystal-silicon-based substrate for fixing two ends of the polysilicon diaphragm and forming a sealed cavity between the polysilicon diaphragm and the non-single-crystal-silicon-based substrate;
a stationary electrode directly positioned on the non-single-crystal-silicon-based substrate and below the polysilicon diaphragm, the stationary electrode and the polysilicon diaphragm constituting a plate capacitor; and
a thin film transistor (TFT) control circuit positioned on the non-single-crystal-silicon-based substrate and electrically connected to the plate capacitor.

Regarding US 6,472,962, Guo discloses an LCR-RF switching device including:
a substrate 80 which may be a semiconductor wafer comprising monocrystalline silicon, and a dielectric material such as silicon dioxide or a low-k material (col.5, lines 66-67);
a membrane 122 (col.6 lines 36-39);
posts 118 (col.7 lines 13-14);
an up electrode 100 (col.6 lines 25-36); and
an air gap 123 between the membrane 122 and the up electrode 100 (col.6, lines 47-50).

Regarding US 6,174,820, Habermehl discloses a hinged member 110 and a supporter made of polysilicon (col. 13 lines 19-36).

Regarding US 6,845,034, Bhattacharyya shows a TFT control circuit 1804 positioned on the substrate and electrically connected to the plate capacitor (MEMS) 1830.

Guo discloses an LCR-RF switching device having a MEMS capacitor. The MEMS capacitor of the switching device has an UP state and a DOWN state. If voltage potential between the down electrode 92 and the membrane 122 is less than the minimum activation voltage, the MEMS capacitor is in the UP state. Under a contrary condition, the MEMS capacitor is in the DOWN state. It can be seen that MEMS capacitor of Guo is **functionally and operationally different** from the pressure sensor of the present application.

In addition, although the Examiner mentioned that Lin (US 6,642,593) teaches a substrate 20 (Fig.1h) which can be made of other microwave quality substrate such as a quartz or sapphire substrate, and asserts that it would have been obvious to one having ordinary skill in the art at the time of the invention was made to form a glass substrate or a quartz substrate in Guo, Habermehl or Bhattacharyya device. However, the applicant disagrees and asserts that it would not have been obvious to one having ordinary skill in the art to incorporate Lin's teaching into Guo, Habermehl or Bhattacharyya device. In Lin's teaching, the substrate 20 includes an insulator layer 30 such as a silicon dioxide layer, and the electrode layer 40 is formed on the insulator layer 30, rather than on the substrate 20. On the other hand, the stationary electrode 40 of the present application is **directly** positioned on the glass substrate or the quartz substrate 32 as recited in claim 1 and claim 10. Thus, the applicant believes both claims 1 and 10 are patentable over Guo in view of Habermehl and Bhattacharyya and further in view of Lin. Therefore, reconsideration of claims 1 and 10 is respectfully requested.

Regarding claims 9 and 22, **none** of the cited arts including Guo, Habermehl, Bhattacharyya and Lin teaches **a thin film transistor display region for displaying a variation of pressure**. The applicant has argued this limitation in the response to the

previous office action, but the Examiner fails to show any relevant disclosure concerning this limitation in this Office action. Therefore, it would not have been obvious to one having ordinary skill in the art to form a thin film transistor display region in the pressure sensor in view of Guo, Habermehl, and Bhattacharyya. Thus, reconsideration of claims 9 and 22 is respectfully requested.

Claims 3 and 5-8 are dependent on claim 1 and should be allowed if claim 1 is allowed. Reconsideration of claims 3, and 5-8 is therefore respectfully requested.

Claims 11-15, 17 and 19 are dependent on claim 10 and should be allowed if claim 10 is allowed. Reconsideration of claims 11-15, 17 and 19 is therefore respectfully requested.

6. **Rejection of claims 20-21 under 35 U.S.C. 103(a) as being unpatentable over Guo et al. (US 6,472,962) in view of Habermehl et al. (US 6,174,820), Bhattacharyya (US 6,845,034) and Lin et al. US (6,642,593), as applied to claim 10 above and further in view of Shrauger (US 2003/0020094):**

Claims 20-21 are dependent on claim 10 and should be allowed if claim 10 is allowed. Reconsideration of claims 20-21 is therefore respectfully requested.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Sincerely yours,

Winston Hsu Date: November 21, 2005

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Note: Please leave a message in my voice mail if you need to talk to me. (The time in D.C. is 13 hours behind the Taiwan time, i.e. 9 AM in D.C. = 10 PM in Taiwan.)